

REMARKS

The specification at pages 7 and 18 has been amended to correct inadvertent, obvious errors.

As recited in the amended claims, the invention is directed to a graft copolymer and process for preparing the same, wherein a branched polymer having a fluoroalkyl group (page 9, lines 16-19) is bonded to a trunk polymer through a linkage having a -C(=O)NH- group (page 3, lines 2-5), and the linkage having a -C(=O)NH- group is formed by reacting an active hydrogen group of a chain transfer agent constituting the branched polymer with an isocyanate group contained in a monomer constituting the trunk polymer (page 11, line 6 - page 12, line 4).

Entry of the amendments is respectfully requested.

Review and reconsideration on the merits are requested.

Claims 1 and 3-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 3,632,391 to Whitfield et al or U.S. Patent 5,180,766 to Hayama et al.

Applicants respectfully traverse for the following reasons.

Claims 4 and 5 are directed to a process for preparing the graft copolymer. Claim 4 corresponds to method (A) of copolymerizing a macromonomer described at page 16, lines 9-14 of the specification, whereas claim 5 is directed to the method (B) (method of separately polymerizing a branch polymer and a trunk polymer) described at page 16, lines 15-19 of the specification. Since these are process claims, the Examiner is obligated to consider the process limitations therein, independent of the graft copolymer.

The graft copolymer of the present invention provides high water-and oil-repellency despite a small fluorine content, and is also soluble in a petroleum solvent (page 2, lines 16-20 of the specification). Furthermore, the graft copolymer of the invention can exhibit both the function of the fluorine-containing component and that of the hydrocarbon component. Namely, the graft copolymer of the invention can reconcile the softness of treated articles (especially, textiles) with high water-and oil-repellency effect and solubility in a petroleum solvent (page 34, lines 2-9 of the specification).

In the graft copolymer of the invention, the branch polymer is a fluorine-containing polymer and the trunk polymer (preferably) contains a fluorine-free (hydrocarbon) polymer as a main component. The branch polymer having a fluoroalkyl group is bonded to the trunk polymer through a linkage having a $-C(=O)NH-$ group. Furthermore, the branch polymer is grafted at an isocyanate group moiety of the trunk polymer, and the trunk polymer has a repeating unit derived from an isocyanate group-containing vinyl monomer and a repeating unit derived from another copolymerizable monomer (page 2, line 21 - page 3, line 15 of the specification).

The cited prior art is addressed below.

(i) Whitfield et al:

In Whitfield et al, a solution of component (A) which is an addition polymer and a solution of component B (fixative) are serially coated onto a fibrous substrate in separate phases so that a cross-linking reaction takes place at the boundary between the phases. Generally, the phases are mutually insoluble to preserve a boundary therebetween (col. 17, lines 68 - col. 18,

line 27). The result is a fibrous material carrying a deposit of a preformed polymer containing functional groups, which is cross-linked *in situ* through reaction with a fixative containing functional groups complementary to those on the polymer (Abstract and claim 1).

More particularly, Whitfield et al discloses reacting a polymer with another polymer. That is, Whitfield et al discloses a cross-linked polymer (see, for example, column 2, lines 50-52) and does not disclose a graft copolymer as claimed in claim 3. In this regard, a cross-linked polymer (which requires two active ends in a side chain) is quite different from a graft polymer (which requires only a single reactive end in the side chain). Because Whitfield describes cross-linking, one of ordinary skill in the art could not readily arrive at the graft copolymer as claimed in claim 3 based on the teachings of Whitfield et al. Furthermore the process of Whitfield et al is entirely different from the processes of present claims 4 and 5. That is, Whitfield et al does not describe a method of copolymerizing a macromonomer as recited in claim 4, or a method of separately polymerizing a branch polymer and a trunk polymer as claimed in claim 5.

(ii) Hayama et al:

Hayama et al discloses a resin composition which provides a primer useful for enhancing the adhesion between polyolefin resin substrates and fluorine-containing resins (column 1, lines 7-10), and fails to disclose a water- and oil-repellent composition as claimed in amended claim 3. Hayama et al discloses a process in which a functional group is introduced into the trunk polymer. Such process is entirely different from that of present claim 4 which polymerizes a trunk monomer having a branched polymer to form a trunk polymer. Moreover, because Hayama et al does not disclose copolymerizing an isocyanate group-containing vinyl monomer

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No.: 10/070,978

to obtain a trunk polymer, Hayama et al also does not disclose, teach or suggest the process of present claim 5.

For the above reasons, it is respectfully submitted that the claims amended herein are patentable over Whitfield et al and Hayama et al, and withdrawal of the foregoing rejection under 35 U.S.C. § 103(a) is respectfully requested.

Withdrawal of all rejections and allowance of claims 3-8 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

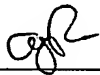
Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

23373

CUSTOMER NUMBER



Abraham J. Rosner
Registration No. 33,276

Date: October 20, 2003